Nokeval

No 110507

User's Manual

Models 575F-1000F-1100-1800F-2011
for process inputs

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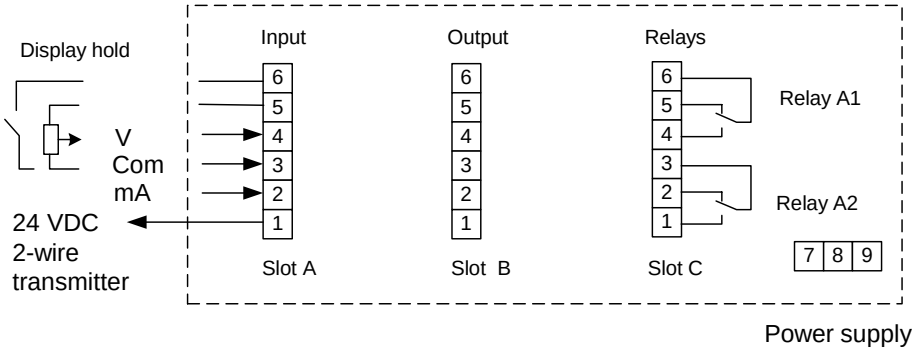
Manufacturer:

Nokeval Oy

Yrittäjäkatu 12
37100 NOKIA, FINLAND
Tel. +358 (0)3 342 4800
Fax. +358 (0)3 342 2066
http//:www.nokeval.com

Field display X-2011



General Description

Indicator X-2011 is designed for general process inputs 0/4..20 mA, 0..5/10V and potentiometers 100Ω-10 kΩ. Designers main goal has been to achieve a unit with fast introduction time and easy of use. Input selection and display scaling can be easily done by front panel keys (4 keys). Optional alarm level and hysteresis - additional card 2000-REL wtih two NC/NO relays - can also be easily controlled from indicators front panel.
X-2011 measuring accuracy is 0,05% FS (15 bits) and it is designed for 3-4 digit panel mounted process display. When wider span is used display value can be stabilized with freely selectable filter. This operation makes it possible to use this indicator even as 5 digit display. If larger numerical value is required same time with fast display updating time it is recommended to use indicator model X-2021.
Decimal point position is freely selectable. Separate access codes for configuration and alarm level control can be selected. Display brightness can also be selected via front panel keys. Front panel protection is IP65 i.e. dust and sprinkling water proof.
There are two alternative power possibilities, one for mains voltage 85..230 VAC or 24 VDC. Both are galvanically isolated from inputt. Indicator can supply 24 VDC / 150 mA to sensor or to other field equipment.

Indicator family 2000

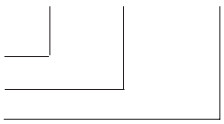
Field display X-2011 is a part of a larger product family. This series field displays are easy to modificate for different type of inputs e.g. X-2011 can be changed for Pt100/thermocouple input simply by changing the input card to type 2021. This kind of modification doesn't require any kind of calibration, user only configures the unit with front panel keys.
When input card is changed it changes also the model type. e.g. if process indicator 2011 is modified for strain gage indicator with 2041-STG input card, the model will change to X-2041.
This model X-2011 is basic indicator in this series. If You require min / max value memory, more alarm relays, temperature input or better accuracy, You should use the model X-2021 display..

Technical specification

Process inputs:	0..20 mA, 4..20 mA, 0..5 V and 0..10V
Range:	-9999..99999 f.ex. 4-20 mA= 58.500..59.500 (span 10.00)
Display hold:	by closing contact
Input resistance:	current 50 Ω, voltage input >1 MΩ
Accuracy:	0.05% FS
Sensor supply:	24 VDC, max. 50 mA
Potentiometer:	100Ω -10 kΩ
Reference voltage:	2.5 V max load current 25 mA
Accuracy:	0.05 % FS
Alarms: (option)	2 alarms, relays max 240 VAC, 2 A, selectable hysteresis 100%, automatic or manual reset, selectable direction
General:	
Input filter:	Digital, freely selectable
AD-converter:	15 bits (1/32000)
Measuring speed:	7 meas. /second
Temperature effect:	0.005 %/°C
Alarm indicators:	2, A1 and A2
Power supply:	85..240 VAC or 12..30 VDC / 22..28 VAC
Consumption:	12 W without sensor supply. F.ex. 24 VDC, 0.5 A
Case material:	575F: Dark noryl 1000F-1100F-1800F: black metal
Terminals:	2.5 mm^2 removable
Digit size	57 mm (575F), 100 mm (1000F and 1100F) or 180 mm (1800F)
Power supply	85..240 VAC or 24VDC
Case protection	IP65
Weight	575F: 3 kg, 1000F: 5 kg, 1100F: 8 kg, 1800F: 15 kg

How to order

XX-2011-REL2-24VDC

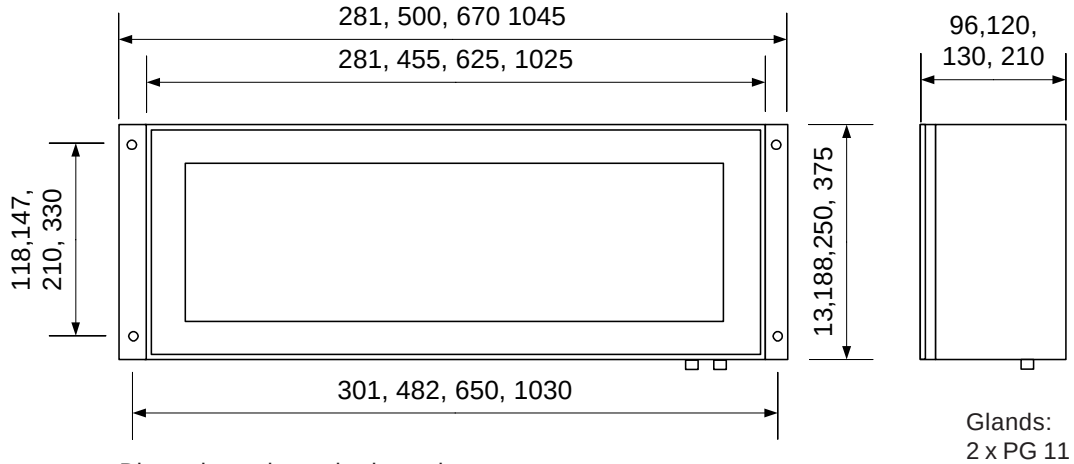


XX,=575F,1000F, 1100F or 1800F
Input card
Alarm card REL2
Supply voltage
85..240 VAC or 24VDC
Last parameter always power 24 VDC or 230 VAC

Order types doesn't contain optional card symbol '2000'. e.g. 2000-REL2 is specified only REL2. Unit may have one input card and two optional cards.

Unit can be updated to other input types only by changing the input card and adding needed option cards. Optional cards are same for all 2000-series units.
Alarm card 2000-REL2 (REL2 with type code)

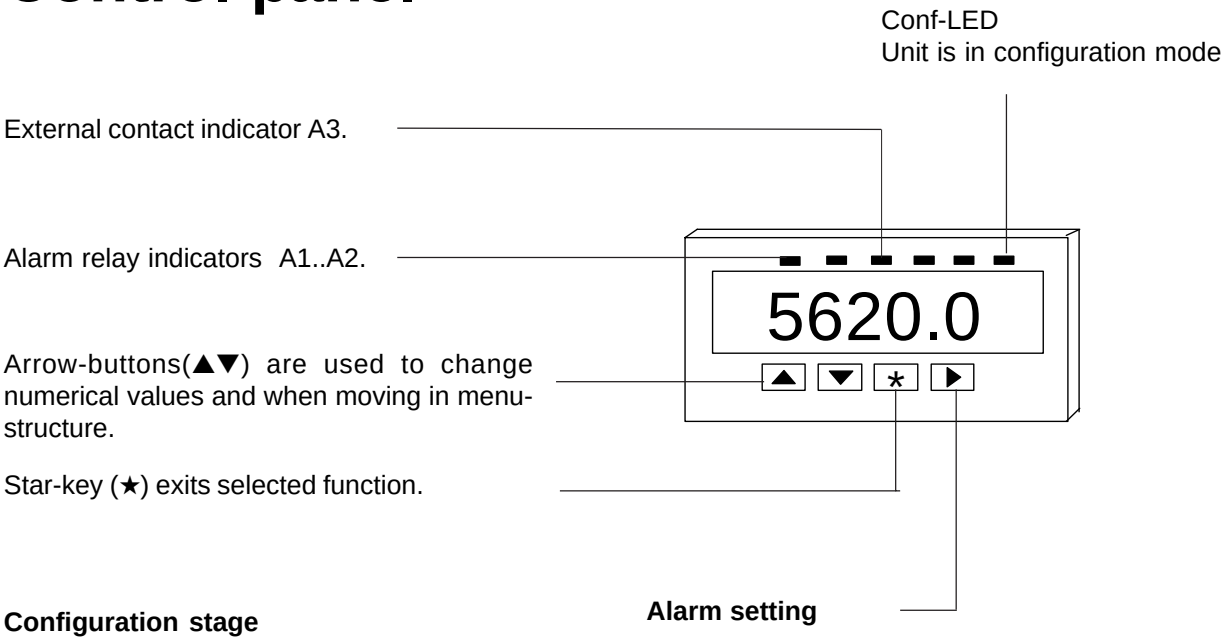
Dimensions:



Dimensions shown in the order:
575F, 1000F, 1100F, 1800F

1000F-1800F metal enclosure
575F plastic enclosure

Control panel


Conf-LED
Unit is in configuration mode
External contact indicator A3.
Alarm relay indicators A1..A2.
Arrow-buttons(▲▼) are used to change numerical values and when moving in menu-structure.
Star-key (★) exits selected function.
5620.0

Configuration stage

Configuration can be started by pressing and holding ★- and ▲-keys simultaneously for 2 seconds. Configuration stage is for selecting input, display scaling and alarm function (NC/NO).
Specified instructions on pages 6-7 Configuration.

Resetting access code

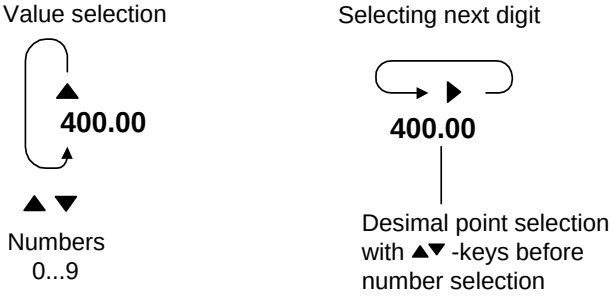
If configuration access code is forgotten, the access code can be reset by switching power off and holding down buttons ★ and ➤ while connecting power back again.

Alarm setting

If alarm state is secured with access code (ALCode) it must be entered before user can change/ view alarm levels (see access code setting on page 7).
Alarm values can be changed and viewed in measuring stage. Other functions must be done in configuration mode. Unit has two alarm levels which can be viewed with ➤-button. After ➤-press lights A1-LED and display shows alarm1 level, A1-LED blinks to inform that unit is in alarm level stage. Second ➤-bush lights A2-LED and indicator shows alarm 2 level. Third press returns display into measuring stage. If buttons are not pressed with in 60 seconds unit returns automatically into measuring stage.
When A1 or A2 led blinks user can enter edit mode by pressing ▲ or ▼-key. Values can be changed as described below. Accept change by -key.

Alarm level setting

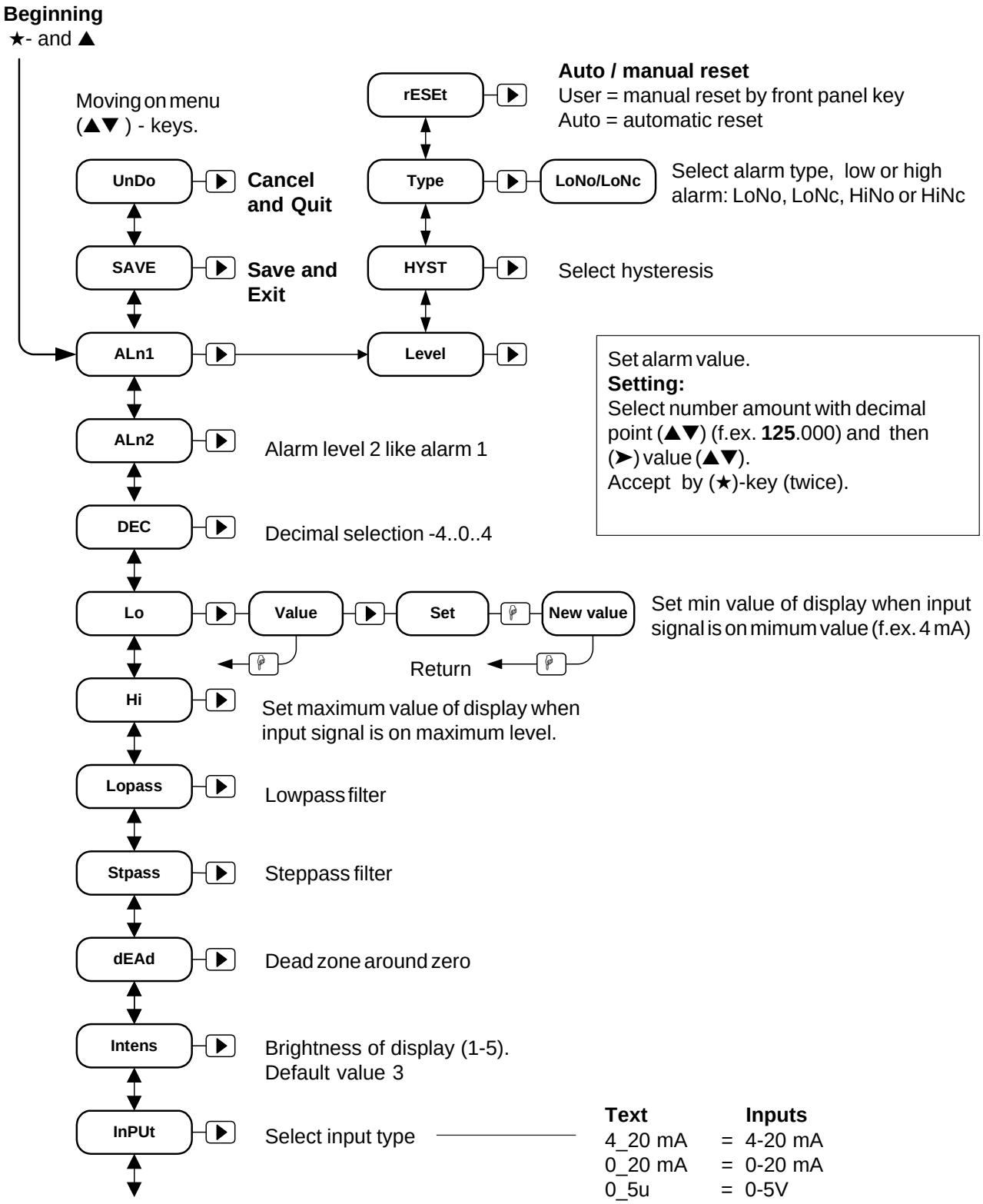
Alarm levels are selected with ▲▼-buttons one number at a time. Changing begins from the most signifigant digit on the left, decimal point is selected first. Next digit to right is selected with ➤-button.
Accept and exit with ★ -button.



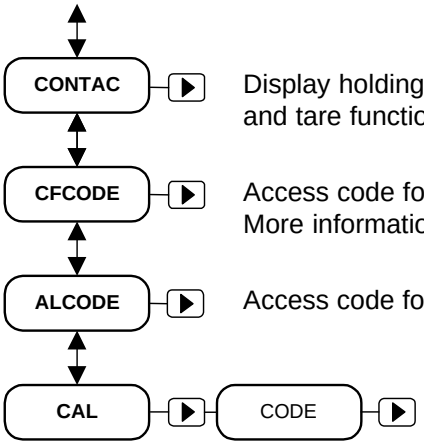
Configuration

Configuration can be started by pressing and holding ★- and ▲-keys simultaneously for 2 seconds. Arrow keys ▲▼ moves up and down in main menu. Desired function is selected with ➤-key. Save mode can be selected directly by pushing ★-key in main menu.
To save and exit, push ➤ while save is displayed.

Alarm values can be selected in configuration mode or in measuring mode. Hysteresis and alarm type can be selected only in configuration mode.
Changes can be restored by selecting text UnDO into display and pressing ➤-key. **Note!** Detailed configuration stage description on next page.



Text	Inputs
4_20 mA	= 4-20 mA
0_20 mA	= 0-20 mA
0_5u	= 0-5V
0_10u	= 0-10V
SPec	= Special range
Pot	= Potentiometer



Display holding, alarm reset and tare function

Access code for configuration
More information on next page.

Access code for alarms

Calibration. See details on potentiometer calibration.

External contact selection

OFF	External contact not in use
HoLd	Display holding, by closing contact
ALrESE	Alarms reset, by external contact
ZEro	Tare function
NoFiLt	Bypassing the filter

Configuration parameters

To enter into configuration mode press and hold ▲ and ★-keys simultaneously for 2 seconds. Save mode can be selected directly by pushing ★-key in main menu, otherwise ★-key moves backwards. Words printed in *italic* represent indicators display symbols.

Undo, Save **(➤)**
Exit configuration mode without saving changes (*Undo*) or save changes (*Save*).

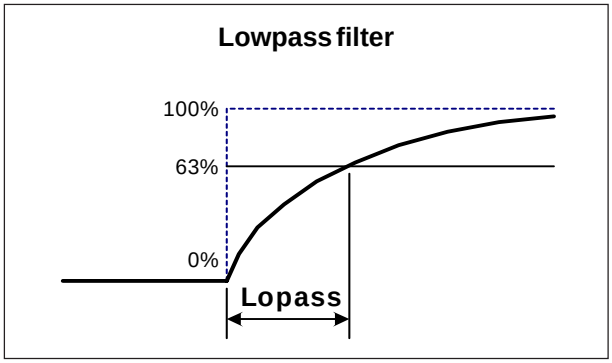
Alarms
Alm 1 and Alm 2 **(➤)**

Level = alarm level
Hyst = hysteresis, High level alarm
Type = Alarm type selection
Select one of the following
LoNo, Low level, contact normal open
HiNo, High level, contact normal open
LoNc, Low level, contact normal closed
HiNc, High level, contact normal closed
Reset **Auto or manual reset**
User = manual reset from front panel or external contact (conf menu - **contac**)
Auto = automatic reset

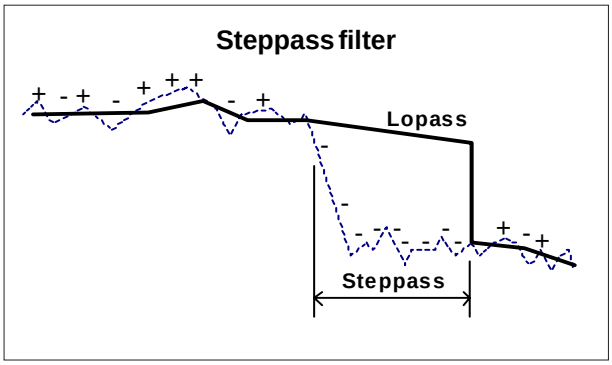
Dec **(➤)**
Number of decimals in display. Select 0…4 with ▲▼-keys and accept with ★-key. When Dec value is negative the corresponding number of last digits is rounded to zero. f.ex. Dec = -2: two last digits are always zero.

Lo, Hi **(➤)**
Display scaling. **Lo**-value represents display scaling at 4 mA (or 0 mA / 0V) and **Hi**-value which is represents display scaling at 20 mA (10V), F. ex. 4 mA=0.0 and 20 mA=100.0.
When value is in display it can be changed by pushing ➤-key or continue straight into SAVE mode with ★.

Lopass **(➤)**
First order digital lowpass filter for input. Functions like a RC circuit damping variations in the reading. Set the time constant in seconds (63 % of step change)
0.000 = no damping
0.500 = normal damping
8191 = maximum damping



Stpass **(➤)**
Steppass filter. When strong damping (see Lopass filter) in used, it takes very long for the indicator to settle after large changes in input value. This can be eliminated with steppass filter. Normally the unfiltered input value (dashed line in the graph) fluctuates around the filtered value. However after large changes the sign of the difference between unfiltered and filtered value will remain unchanged for a while. When this time exceeds the Stpass value (in seconds) the lopass filter is reset and the indicator will jump to the current input value.



***Dead* (➤)**
Dead zone around zero. If the input reading is smaller than the Dead value, the display is rounded to zero. This is especially handy in weighing and flow measurement applications.
To prevent negative values only, set Dead = 0. To disable the dead zone, set Dead = -1 or any negative value.

***Intens* (➤)**
Display brightness 1-5 (st to select, accept with ★), factory default 4, (5=brightest).

Input selection

Input (➤) Select input

Display	**Input**
4_20 mA	= 4-20 mA
0_20 mA	= 0-20 mA
0_5u	= 0-5V
0_10u	= 0-10V
SPEC	= Factory settings
Pot	= Potentiometer

External contact function

Contac (➤)

OFF = External contact not ni use
Hold = Display holding, by external closing contact
ALrESE = Alarms reset, by external contact (if **user** function selected from the **reset** function)
ZEro = Tare function by external contact or front panel ★-key. Tare function resets of that moment display value. (Tare can be removed by pressing the front panel ★ and ➤-keys at the same time)
NoFILt = Lopass filter bypass. Use when there is a switch indicating large changes in input value.

Access code functions

Access code can be entered when the display shows ***-Code-***. Access code is formed with ▲▼★➤-keys. Each time key is pressed line (-) moves from left to right.
Entering access code must be started within 3 second after text ***-Code-*** appears to display.
Total number of combinations is 4^6 = 4096.
Note! If You enter ★★★★★★, it means that access code is not used.
If configuration access code is forgotten, the access code can be reset by switching power off and holding down buttons ★ and ➤ while connecting power back again.

To remember access code better it is recommended to give 'names' to buttons: 1=▲, 2=▼, 3=★, 4=➤. This helps You to form codes with numbers e.g. number 143311 = ▲➤★★▲▲.

***CFCode* (➤)**
Access code for configuration mode. If You feel that You entered wrong code, You can enter it again. See detailed instructions above.

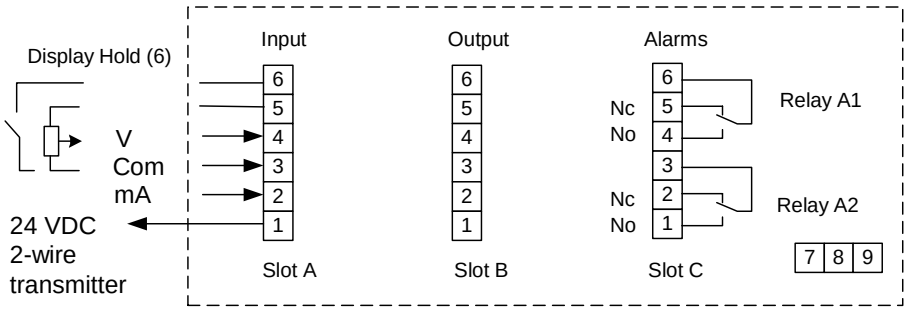
***ALCode* (➤)**
Access code for alarm level mode. Must be entered to access into alarm level setting mode from normal measuring mode.

Teaching potentiometer range

***CAL* (➤)**
Select text CAL into display with ▲▼-keys. Push ➤. Enter access code ★★★★★★.
Select with ▲▼ -keys text **POt** into display and led A1 lits. Turn potentiometer into minimum and press ➤-key for 1 second. Select ▲▼ text **Pot** and led A2. Turn potentiometer into maximum position and press ➤.
Exit to main menu with ★-key.

X-2011 Connections

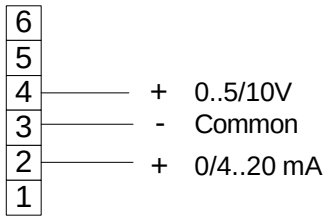
Input/output cards



Slot A is for sensor input and slots B and C for optional cards.

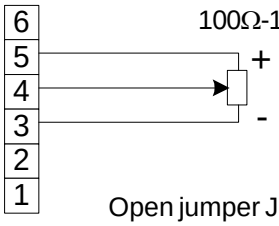
Power supply 85..240 VAC (connectors 7 and 8 grey connector) or 24 VDC (green connettor 7 and 9 no polarity)

Voltage / current-input



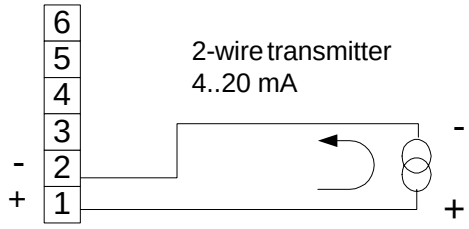
Potentiometer

Potentiometer size: 100Ω-10kΩ



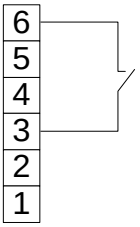
Open jumper J2 when potentiometer is used

2-wire transmitter



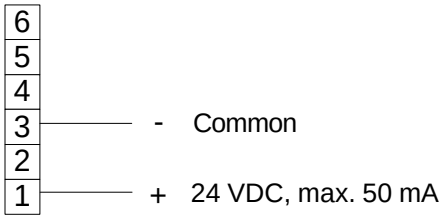
Power supply for transmitter 24 V max. 150 mA

External contact



(Slot A)

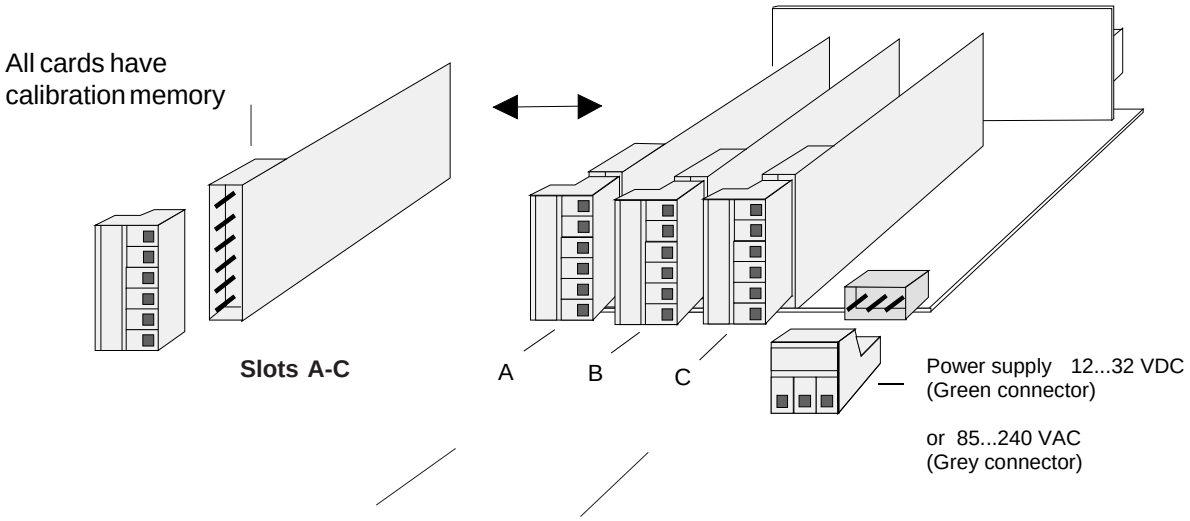
Sensor supply 24 VDC /50 mA



Construction of field display series

The field display series is modular and easy to assemble according to customers wishes. The basic construction consists of mother board with tree slots, A, B and C. Slot A determines meter type and provides always input signal. Slot B and C are interchangeable. As factory delivery input signal is always installed into slot A, output into slot B and alarms into slot C. In case of f.ex 4 alarms and relay card with 2 change-over contact (2 + 2 relays) are used, you must place second relay card into slot B.

You can have different types of meters by only changing the input card in slot A. Data sheet of each type of meter dictates the possible combinations. Recalibration of card is not needed; only scaling and other settings must be set using front panel keys.

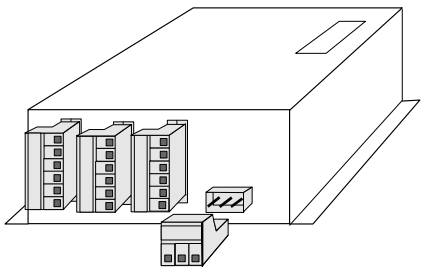


Change of meter type:
Input card is placed always to slot A. By changing input card you can get an other type of meter. You can change meter with pulse input to meter with current input, thermocouple, strain gage etc.

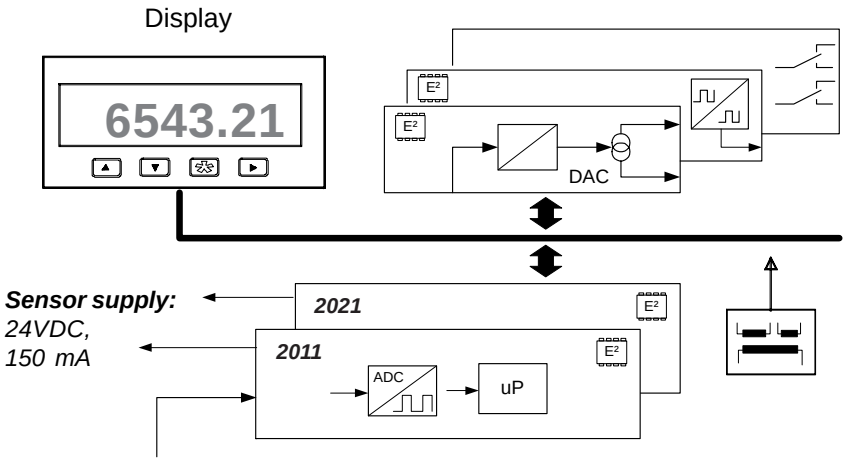
Additional slots:
Additional cards provide output 4..20 mA, alarms, serial interface, BCD output etc. Meter data sheet dictates possible combinations. grey connectors allow line voltage 110..240 VAC (relay contacts).

Power supply:
There are two different mother boards power supply 85..240 VAC and 12..32 VDC. VDC-mother board accepts 24 VAC. Connectors are colour coded.

Control electronic case:



Modular field display series 575F...1800F



Sensor supply:
24VDC,
150 mA

Process inputs (model 2011):
0..20 mA**,** 4..20 mA
0..5/10 V
Potentiometer 100Ω..5kΩ

Input card contains:
- microprocessor
- bus control
- keys control
- display control

Option cards

Alarm cards:
2 relay card, 4 alarm types, change over contacts
3 relay card, closing contacts
4 I/O-ports

Model 2011:
2 relays change over contacts (also with remote reset)

Output cards (not for 2011):
0/4..20 mA, 0..10 V
RS232 or RS485

Power supply:
85..240VAC or
12..32 VDC / 24 VAC

Model 2021 contains also process inputs but it can also measure RTD-sensors and thermocouples. 2021 has very accurate and fast A/D-converter (16 bit 1/64 000).

2000 series input and option cards:

2011-IN	Process input
2021-MU	Multi input
2031-IR	Infrared sensor input
2041-SG	Strain gage measurement
2051-PU	Scaleable frequency indicator
2061-CO	Counter input (max 5 kHz)
2066-SEC	Timer function, s/min/h ext.
2071-RS	Serial input RS232 / RS485
2081-BCD	BCD-, Gray- binary code input (1-5 digits)

2000-BASE	Base card with power supply
2000-REL2	Alarm card, NO/NC
2000-REL3	Alarm card, Closing contacts
2000-OUT	Output card, U and I
2000-RS	Serial output RS232 or RS485
2000-I/O	4 pcs input /output ports (60 V / 100 mA)

Manufacturer:
Nokeval Oy
Yrittäjäkatu 12
37100 NOKIA
Tel. +358 (0)3 342 4800
Fax. +358 (0)3 342 2066
http://www.nokeval.com